An Update on the Treatment of Osteoarthritis of the Knee

A/Prof Lo Ngai Nung
Senior Consultant
Dept of Orthopaedic Surgery
Singapore General Hospital

Bilateral tibia vara with severe osteoarthritis
Objectives of Treatment

- Relieve pain, swelling and stiffness
- Improve function and restore alignment
- Improve quality of life
Implication of Recommendations

Strong – Quality of evidence is high. Practitioners should follow a strong recommendation.

Moderate – Quality of evidence not as strong but benefits exceed potential harm. Practitioners should generally follow a moderate recommendation but be sensitive to patient preferences.

Inconclusive – Lack of compelling evidence. Practitioners should feel little constraint in following the recommendation but exercise judgement and consider patient preference.
Recommendation 1: Exercises

We recommend that patients with symptomatic osteoarthritis of the knee participate in self-management programs, strengthening, low-impact aerobic exercises, and neuromuscular education; and engage in physical activity consistent with national guidelines.

Strength of Recommendation: Strong

Give handouts for home exercises

Exercises that strengthen the quadriceps
30 min of brisk walking daily

Low impact exercises

Exercises that promote strength and balance
Recommendation 2: Weight Loss

We suggest weight loss for patients with symptomatic osteoarthritis of the knee and a BMI ≥25.

Strength of Recommendation: Moderate

Aim to loose minimum 5% of body weight
Non-Surgical Management of Knee Osteoarthritis
March 4, 2014
Patient Summary

For the first time, OARSI has developed treatment guidelines tailored to different types of patients with osteoarthritis (OA) of the knee. These guidelines are based on a comprehensive review of the current scientific evidence for each treatment’s safety and effectiveness. Surgical treatments, the costs of treatments, or their coverage by insurance were not taken into consideration here. These guidelines are designed to help you and your physician determine the best course of treatment for your particular set of circumstances.

In general, OARSI recommends that patients and their physicians always start with non-drug therapies, especially physical activity and maintaining a healthy weight, which are often as effective at managing symptoms of knee OA as drug treatments that carry more risk. If drug treatment is needed for further symptom relief, OARSI recommends starting local first, that is, using topical pain medications and ointments or injections directly to the knee.

For ALL patients with osteoarthritis (OA) of the knee, OARSI recommends the following treatments:

- Land-based exercise (e.g., resistance exercise, walking, t’ai chi)
- Weight management*
- Strength training (exercises to increase leg muscle strength)
- Water-based exercise (swimming, water aerobics)
- Self-management and education

*The OARSI guidelines specifically found that achieving a weight loss of 5% of total body weight within a 20-week period was most effective for treatment of knee OA.

For additional recommended treatments, find the description below that matches your circumstances.

1. You only have OA in the knee(s) and no other conditions that might affect your treatment:
Recommendation 3A : Acupuncture
We cannot recommend using acupuncture in patients with symptomatic osteoarthritis of the knee.
Strength of Recommendation : Strong

Recommendation 3B : Physical agents
We are unable to recommend for or against the use of physical agents (including electrotherapeutic modalities) in patients with symptomatic osteoarthritis of the knee.
Strength of Recommendation : Inconclusive

Recommendation 3C : Manual Therapy
We are unable to recommend for or against manual therapy in patients with symptomatic osteoarthritis of the knee.
Strength of Recommendation : Inconclusive
Recommendation 4 : Unloader Knee Braces

We are unable to recommend for or against the use of a valgus directing force brace (medial compartment unloader) for patients with symptomatic osteoarthritis of the knee.

Strength of Recommendation : Inconclusive
Recommendation 5: Lateral Shoe Wedges

We cannot suggest that lateral wedge insoles be used for patients with symptomatic medial compartment osteoarthritis of the knee.

Strength of Recommendation: Moderate
Recommendation 6: Glucosamine

We cannot recommend using glucosamine and chondroitin for patients with symptomatic osteoarthritis of the knee.

Strength of Recommendation: Strong
Does Glucosamine help?

Long-term effects of glucosamine sulphate on osteoarthritis progression: a randomised, placebo-controlled clinical trial

Jean Yves Reginster, Rita Deroisy, Lucio C Rovati, Richard L Lee, Eric Lejeune, Olivier Brugere, Giampaolo Giacovelli, Yves Heinotin, Jane E Davre, Christiane Gossett

Summary

Background Treatment of osteoarthritis is usually limited to short-term symptom control. We assessed the effects of the specific drug glucosamine sulphate on the long-term progression of osteoarthritis joint structure changes and symptoms.

Methods We did a randomised, double-blind placebo controlled trial, in which 212 patients with knee osteoarthritis were randomly assigned 1500 mg sulphate oral glucosamine or placebo once daily for 3 years. Weight-bearing, anteroposterior radiographs of each knee in full extension were taken at enrolment and after 1 and 3 years. Mean joint-space width of the medial compartment of the tibiofemoral joint was assessed by digital image analysis, whereas minimum joint-space width—ie, at the narrowest point—was measured by visual inspection with a magnifying lens. Symptoms were scored by the Western Ontario and McMaster Universities WOMAC osteoarthritis index.

Findings The 106 patients on placebo had a progressive joint-space narrowing, with a mean joint-space loss after 3 years of −0.31 mm (95% CI −0.48 to −0.13). There was no significant joint-space loss in the 106 patients on glucosamine sulphate: −0.06 mm (−0.22 to 0.09). Similar results were reported with minimum joint-space narrowing. As assessed by WOMAC scores, symptoms worsened slightly in patients on placebo compared with the improvement observed after treatment with glucosamine sulphate. There were no differences in safety or reasons for early withdrawal between the treatment and placebo groups.

Interpretation The long-term combined structure-modifying and symptom-modifying effects of glucosamine sulphate suggest that it could be a disease modifying agent in osteoarthritis.

Introduction Osteoarthritis is a major cause of disability and is among the most frequent forms of musculoskeletal disorders. The goal of pharmacological treatment is usually to control symptoms of the disease, pain, and limitation of function, which is traditionally accomplished by the use of analgesic agents or non-steroidal anti-inflammatory drugs (NSAIDs).

Keywords: Glucosamine sulphate, osteoarthritis, knee radiographs, WOMAC index, placebo-controlled trial, long-term treatment.

Objectives

To review randomized controlled trials (RCTs) evaluating the effectiveness and toxicity of glucosamine in OA.

Search methods

We searched CENTRAL and the Cochrane Database of Systematic Reviews (The Cochrane Library), MEDLINE, PREMEDLINE, EMBASE, AMED, ACP Journal Club, DARE (to January 2008), contacted content experts, and handsearched reference lists and pertinent review articles.

Selection criteria

RCTs evaluating the effectiveness and safety of glucosamine in OA.

Data collection and analysis

Data abstraction was performed independently by two review authors and investigators were contacted for missing data.

Main results

This update includes 25 studies with 4963 patients. Analysis restricted to studies with adequate allocation concealment failed to show any benefit of glucosamine for pain (based on a pooled measure of different pain scales) and WOMAC pain, function and stiffness subscales; however, it was found to be better than placebo using the Lequesne index (standardized mean difference (SMD) -0.54; 95% confidence interval (CI) -0.96 to -0.12). Collectively, the 25 RCTs favoured glucosamine with a 22% (change from baseline) improvement in pain (SMD -0.47; 95% CI -0.72 to -0.23) and a 11% (change from baseline) improvement in function using the Lequesne index (SMD -0.47; 95% CI -0.82 to -0.12). However, the results were not uniformly positive and the reasons for this remain unexplained. WOMAC pain, function and stiffness outcomes did not reach statistical significance.

RCTs in which the Rotta preparation of glucosamine was compared to placebo found glucosamine superior for pain (SMD -1.11; 95% CI -1.66 to -0.57) and function (Lequesne index SMD -0.47; 95% CI -0.82 to -0.12). Pooled results for pain (SMD -0.05; 95% CI -0.15 to 0.05) and function using the WOMAC index (SMD -0.01; 95% CI -0.13 to 0.10) in those RCTs using a non-Rotta preparation of glucosamine did not reach statistical significance. Two RCTs using the Rotta preparation showed that glucosamine was able to slow radiological progression of OA of the knee over a three-year period (mean difference (MD) 0.32; 95% CI 0.05 to 0.58).

Glucosamine was as safe as placebo in terms of the number of participants reporting adverse reactions (relative risk ratio 0.99; 95% CI 0.91 to 1.07).

Authors’ conclusions

Pooled results from studies using a non-Rotta preparation or adequate allocation concealment failed to show benefit in pain and WOMAC function while those studies evaluating the Rotta preparation showed that glucosamine was superior to placebo in the treatment of pain and functional impairment resulting from symptomatic OA.
Recommendation 7A: Pharmacological treatment

We recommend nonsteroidal anti-inflammatory drugs (NSAIDs; oral or topical) or Tramadol for patients with symptomatic osteoarthritis of the knee.

Strength of Recommendation: Strong
Recommendation 7B: Panadol, Opioids, Pain Patches

We are unable to recommend for or against the use of acetaminophen, opioids, or pain patches for patients with symptomatic osteoarthritis of the knee.

Strength of Recommendation: Inconclusive
Recommendation 8 : I/A Corticosteroids

We are unable to recommend for or against the use of intra-articular (IA) corticosteroids for patients with symptomatic osteoarthritis of the knee.

Strength of Recommendation : Inconclusive
Recommendation 9 : I/A Hyaluronic Acid

We cannot recommend using hyaluronic acid for patients with symptomatic osteoarthritis of the knee.

Strength of Recommendation : Strong

“When we differentiated high- vs low-molecular weight viscosupplementation,... most of statistically significant outcomes were associated with high molecular weight cross-linked hyaluronic acid.”
Recommendation 10: Growth Factor Injections, PRP

We are unable to recommend for or against growth factor injections and/or platelet rich plasma for patients with symptomatic osteoarthritis of the knee.

Strength of Recommendation: Inconclusive
Get Back to Life with Platelet Rich Plasma (PRP)

1. A small amount of blood is taken from arm
2. PRP is separated from blood
3. PRP is activated
4. The activated PRP is injected into the scalp containing growth factors

Results
Rejuvenate and repair hair follicle

FOREHEAD AND BROW REJUVENATION
LOWER EYELID REJUVENATION
MID-FACE LIFT AND CHEEK REJUVENATION
LOWER FACE AND JAW LINE REJUVENATION
NASOLABIAL GROOVE AND UPPER LIP REJUVENATION

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PRP Therapy
Dr. John Lieurance
MH 50:01/2
24 Oct 2013
Licensees / Managers of all Medical Clinics

Platelet-Rich Plasma (PRP) Therapy

It has come to the Ministry’s attention that some clinics are providing Platelet-Rich Plasma (PRP) therapy to patients. Currently, the accepted indications for PRP treatment are:

i) Non-surgical treatment of Acute Muscle and Ligaments Injuries,
ii) Biological augmentation of Acute Achilles Tendon Repairs.

2. Any licensed clinic that intends to provide PRP therapy for indications other than the two listed at Paragraph 1 may only provide it in the context of a formal clinical trial. This means that the clinic needs to apply for a Clinical Trial Certificate from the Health Sciences Authority (HSA) and obtain approval from an Institutional Review Board (IRB) before embarking on a clinical trial.

3. Should you require further clarifications on Clinical Trial Certificate, you may email Mr Foo Yang Tong, Director, Clinical Trials Branch, HSA at FOO_Yang_Tong@hsa.gov.sg.

4. Alternatively, you may email MOH at elis@moh.gov.sg

DR ALEY MOOLAYIL
ACTING ASSISTANT DIRECTOR
LICENSING, INSPECTION & AUDIT BRANCH
Recommendation 11: Needle Lavage

We cannot suggest that the practitioner use needle lavage for patients with symptomatic osteoarthritis of the knee.

Strength of Recommendation: Moderate
Recommendation 12 & 13:
Arthroscopic debridement and lavage, arthroscopic partial meniscectomy

We cannot recommend performing arthroscopy with lavage and/or debridement in patients with a primary diagnosis of symptomatic osteoarthritis of the knee.

Strength of Recommendation: Strong

We are unable to recommend for or against arthroscopic partial meniscectomy in patients with osteoarthritis of the knee with a torn meniscus.

Strength of Recommendation: Inconclusive
Recommendation 14 : Osteotomy

The practitioner might perform a valgus producing proximal tibial osteotomy in patients with symptomatic medial compartment osteoarthritis of the knee.

Strength of Recommendation : Limited
Recommendation 15: Interpositional Device

In the absence of reliable evidence, it is the opinion of the work group not to use the free-floating (un-fixed) interpositional device in patients with symptomatic medial compartment osteoarthritis of the knee.

Strength of Recommendation: Consensus
Data: 838 Patients and 911 Knees

Percentage of Unilateral and Bilateral TKA

- Unilateral TKA: 91%
- Bilateral TKA: 9%

Percentage of Male and Female Patients

- Male: 19%
- Female: 81%

**Inpatient Outcomes Analysis**: All 838 patient data available

**Long-term Outcomes Analysis**: No. of knees available for follow-up at 2 years was 491 (i.e. 54%, patients are still being followed-up, window period is up to 3yrs post op).

There was no difference in characteristics between patients followed-up and patients not yet return for follow-up or lost to follow-up.

Mean age of 67.4 years (Std Dev of 7.2 years)
Long-term Outcomes: Oxford Knee Score, Knee Society Clinical Rating System

There was sustained improvement over time, reaching 50% improvement at 2 years.

Both subjective and objectives scores improved and were sustained over 2 years.

There was a 115% improvement in knee clinical scores at 2 years compared to before surgery.

There was a 45.9% improvement in knee function at 2 years compared to before surgery.
Long-term Outcomes: SF-36

SF-36 Quality of life scores improved by 30% following surgery and was sustained at 2-year follow up.

Improvements in physical and functional domains (physical functioning, role physical, bodily pain, social functioning) were especially marked. This is consistent with Cleveland Clinic data.
Inpatient Outcomes: Death, Infection

**DEATH**
- There was one in-patient death (0.12%) which was un-related to the surgery

**WOUND INFECTION**
- Post-operative infections were classified based on the United States National Nosocomial Infection Surveillance (NNIS) System

Less than 4% of TKR had any kind of infection

- 96%:
- N = 911 knees

- 4%:
- 2 Deep Infections (0.22%)
  Deep infections generally require removal of the implant and extended antibiotic treatment
- 4 Organ/Space Infections (0.44%)
- 31 Superficial Infections (3.4%)
  Superficial infections are treated with antibiotics and dressing and do not require further surgery
Comparison with International Data

- The SGH outcomes compare well with international standards
  - Mortality of 0.12% compares favorably with reported mortality of 0.21% and 0.53% in other studies
  - Deep Infection Rates of 0.22% is consistent with NNIS data
  - Rates of DVT/PE are lower than in international series
  - SF-36 and Knee Society Clinical Rating System score improvement are similar if not better compared to the published literature
A Cost-effectiveness Analysis of Total Hip Arthroplasty for Osteoarthritis of the Hip

Rowland W. Chang, MD, MPH; James M. Pellissier, PhD; Gordon B. Hazen, PhD

Objective.—To quantify the trade-off between the expected increased short- and long-term costs and the expected increase in quality-adjusted life expectancy (QALE) associated with total hip arthroplasty (THA) for persons with functionally significant hip osteoarthritis.

Design.—A cost-effectiveness study was performed from the societal perspective by constructing stochastic tree, decision analytic models designed to estimate lifetime functional outcomes and costs of THA and nonoperative management.

Main Outcome Measures.—A modified four-stage American College of Rheumatology functional status classification was used to measure effectiveness. These functional classes were assigned utility values to allow the relative effectiveness of THA to be expressed in quality-adjusted life years (QALYs). Lifetime costs included costs associated with primary and potential revision surgeries and long-term care costs associated with the functionally dependent class.

Data Used in the Cost-effectiveness Model.—Probability and incidence rate data were summarized from the literature. The THA hospital cost data were obtained from local teaching hospitals’ cost accounting systems. Estimates of required medical costs for functionally significant hip osteoarthritis and for custodial care were derived from Medicare data.

Results.—The THA cost-effectiveness ratio increases with age and is higher for men than for women. In the base-case scenario for 60-year-old white women who have functionally significant but not dependent hip osteoarthritis, the model predicts that THA is cost saving because of the high costs of custodial care associated with dependency due to worsening hip osteoarthritis and that the procedure increases QALE by about 0.8 years. In the base-case scenario for men aged 85 years and older, the average lifetime cost associated with THA is $9100 more than nonoperative management, with an increase in QALE of about 2 years. Thus, the THA cost-effectiveness ratio for men aged 85 years and older is $4600 per QALY gained, less than that of procedures intended to extend life such as coronary artery bypass surgery or renal dialysis. Worst-case analysis suggests that THA remains minimally cost-effective for this oldest age category ($89 000/QALY) even if probabilities, rates, utilities, costs, and the discount rate are simultaneously varied to extreme values that bias the analysis against surgery.

Conclusions.—For persons with hip osteoarthritis associated with significant functional limitation, THA can be cost saving or, at worst, cost-effective in improving QALE when both short- and long-term outcomes are considered. Further research is needed to determine whether this procedure is actually being used in this cost-effective manner, especially in older age categories.

JAMA. 1996;275:85-86

Total Hip Arthroplasty (THA) is commonly used to treat severe osteoarthritis of the hip. In 1990, an estimated 120 000 THAs were performed in North America, the majority of which were for patients aged 60 years or older.1 While THA is generally regarded as an effective means of reducing the pain and functional limitation associated with severe hip osteoarthritis,2 there is concern that a larger share of health care resources will be spent on THA in the future because of the increasing incidence of severe osteoarthritis of the hip, the growing demand for THA, and the high cost associated with this procedure.3 The purpose of this article is to describe the structure and results of a decision analysis model of THA for patients with hip osteoarthritis that assesses the trade-off between the economic impact and improved quality of life associated with THA. The analysis should inform policymakers who wish to prioritize funding for health practices based on cost-effectiveness criteria.

Total hip arthroplasty is primarily done to improve quality of life rather than to extend it. Thus, any analysis of the cost-effectiveness of THA for patients with hip osteoarthritis that allows for comparisons with other health practices must consider the opportunity cost of a unit of life-years not just quantity of life. The quality-adjusted life years (QALY) combines these two concepts and can be used to facilitate cost-effectiveness comparisons with other health practices.

The high use of THA, there are few formal cost-effectiveness analyses of THA for hip osteoarthritis that allow for such comparisons.4 Furthermore, there are no analyses that consider long-term outcomes such as the need for revision surgery or custodial care costs associated with dependency due to worsening hip osteoarthritis. To address these issues, we constructed a decision analytic model of the short- and long-term consequences of THA and hip osteoarthritis.

Cost Effectiveness and Quality of Life in Knee Arthroplasty

Carlos J. Lavernia, MD; Jose F. Guzman, MS, BE; and Andrea Gachupin-Garcia, BS

Few studies quantify the cost of a quality well being as produced by arthroplasty surgery. The objective was to use the Quality of Well Being Index to calculate the cost per quality of well year in knee arthroplasty surgery. The difference in Quality of Well Being Index scores before and after the intervention was calculated and multiplied by the patient’s life expectancy. The procedure cost was divided by this quantity resulting in the cost of a quality well year. One hundred patients underwent a primary knee arthroplasty. There were 30 males (average age, 62 years old) and 70 females (average age, 64 years old). The calculated costs per a quality well year were $30,695 (standard deviation $90,883) at 3 months, $17,804 (standard deviation $25,888) at 6 months, $11,560 (standard deviation $11,874) at 1 year, and $6626 (standard deviation $3567) at 2 years post surgery. Health economists consider an intervention costing less than $30,000 per quality of well year a bargain to society. Cost effectiveness of knee arthroplasty surgery compares favorably with other surgical interventions such as coronary artery bypass surgery ($5000 per quality of well year) and extremely favorable with medical treatments such as renal dialysis ($59,000.00 for the quality well year).

From the Division of Arthritis Surgery, Department of Orthopaedics and Rehabilitation, University of Miami, School of Medicine, Miami, FL. Supported by Howmedica.

Reprint requests to Carlos J. Lavernia, MD, 1321 Northwest 14th Street, Suite 203, Miami, FL 33125.

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